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Legislation Update

- **H.R. 2942 To designate certain lands in the commonwealth of Virginia as a National Scenic Area for protection of the watershed and scenic values, recreation use, protection of wildlife and their habitat, and for other purposes.**

Introduced August 6, 1993, by Robert W. Goodlatte (R-VA) and referred to the Committee on Agriculture. This act may be cited as the "Mount Pleasant National Scenic Area Act."

The purposes of this act are to ensure appropriate protection and preservation of scenic quality, water quality, and water resources; protect and manage vegetation to provide fish and wildlife habitat; including areas that may develop characteristics of old-growth forests; and provide recreation opportunities that are consistent with the purposes of this act.

- **H.R. 3064 To amend section 43 of title 18, United States Code, to extend its protection to individuals who work in animal enterprises.**

Introduced September 14, 1993, by George W. Gekas (R-PA) and referred to the Committee on the Judiciary. Section 43(a) of title

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ALSO IN THIS ISSUE...

The Use Of Behavioral Management Techniques To Reduce Or Eliminate Abnormal Behavior

by
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In the continuing quest to provide optimal care for animals in captivity, the issue of abnormal behaviors is a cause for concern. Whether we call them stereotypic, neurotic, nonadaptive, or atypical, behaviors of this kind are problematic. The consequences of abnormal behaviors range from unpleasant sights for the zoo visitor, as in the case of coprophagy in a resident gorilla, to serious health problems for the animals themselves, such as self-biting in a singly housed rhesus macaque. Animals exhibit abnormal behaviors in a variety of social and environmental contexts: naturalistic and purely functional, large social groupings and singly housed, enriched and sterile. No zoo, laboratory, or breeding facility, it would seem, is exempt. Neither is any species. One approach to dealing with abnormal behavior is through the use of behavioral management techniques. Behavioral management refers to the combined use of positive reinforcement training and environmental enrichment techniques.

Figure 1. Rewarding non-aggressive cooperation helps eliminate disruptive attention-seeking behaviors.

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A variety of strategies to address abnormal behavior have been reported, and they tend to fall into three main categories: feeding manipulations including types of food and methods of feeding (Ruempler, 1991; Bloomsmith, 1988); environmental manipulations and provisioning of toys and apparatus (Bryant, et al., 1988; Fried, et al., 1993); and social manipulations (Reinhardt, 1987). These various strategies have produced mixed results. Unfortunately, even in the best case scenarios, abnormal behaviors are most often reduced, not eliminated. References to the use of training as an intervention for abnormal behavioral problems are still fairly rare (Morgan, et al., 1993; Kirtland, 1993).

There are good reasons why efforts to reduce or eliminate abnormal behavior have limited success. First, the causes of abnormal behavior are often subtle and complex, and tracking down how and why the problem began can be a task worthy of Magnum P.I. Second, the relationship between real or perceived stressors and abnormal behavior can result in the behavior serving as a functional coping strategy for the animal (Gould and Bres, 1986). Once utilized as coping strategies, these behaviors are self-reinforcing and extremely tenacious in nature. Finally, problem behaviors often occur when people are not present, limiting the opportunity for direct intervention.

So, what benefits can behavioral management techniques offer personnel dealing with abnormal behavior problems? The greatest benefit they provide is the means to systematically address abnormal behavior and the underlying behavioral issues. In its purest form, a behavioral management approach is a practical exercise in the scientific method. The following steps illustrate the process.

1. Collect data. This is the question-asking phase of the process. Discovering when, where, and how a behavior occurs, and in relation to what, will ultimately lead you to a best guess as to why it occurs, and provide the basis for effective intervention. Relevant information includes:

- When does the behavior occur?;
- Under what circumstances?;
- Is there a pattern?;
- What outside factors affect the behavior such as feeding or cleaning schedules, medical procedures, the presence of unfamiliar people, activities involving animals other than the target animal, the presence or absence of cage or exhibit furniture, and so on?; and
- What impact do social dynamics have on the behavior such as the social status of the target animal, the lack of compatible conspecifics, the presence or absence of specific group members, and the level of positive and agonistic interactions within the group?

The more objective the data, the better. Formal behavioral studies are ideal, but simple charts for when and how a behavior occurs, filled out by keepers or caregivers as they go about their daily activities, improve the quality of the information.

2. Develop a hypothesis. After a careful discovery process, a list of potential causes and contributing factors should be developed. Then, it's possible to make a guess as to why the abnormal behavior is occurring. For example, we could hypothesize that disruptive behavior by a chimpanzee, like throwing feces or trying to grab caregivers, is an attention-seeking behavior, whether the resulting attention is positive or negative. Or, we could guess that social pressure by the dominant male sea lion coupled with a predictable feeding routine are the underlying causes for a low-ranking sea lion regurgitating for extended periods of time after regularly scheduled feeds. The importance of a well-developed hypothesis is that it is the starting point from which your intervention plan is developed

3. Identify specific behavioral goals and initiate training and enrichment strategies. With a clear hypothesis, you can design and implement an intervention plan to address targeted behaviors from a behavioral management perspective. For example, by definition, reinforcement increases the likelihood that a behavior will recur. In the case of the primate that utilizes disruptive behavior as an attention-seeking measure, look at the situation and determine where the reinforcement is occurring. More than likely, when the animal uses the disruptive behavior it receives a great deal of attention, probably negative, but attention none the less. Indeed, "displays" put on by frustrated humans who have just been "had" can be quite entertaining. But what is perhaps more relevant is what happens when the animal is *not* disruptive. Chances are the human walks right by.

According to the hypothesis, human attention is the reinforcement the animal is seeking. So, when are the rewards occurring, and what are the results? Ironically, feces throwing and arm grabbing are being continuously reinforced, while non-aggressive cooperation is not being reinforced at all. The resultant behavior is consistent with the reinforcement pattern. The intervention strategy is then two fold. First, reinforce the animal when it is *not* disruptive. Stop for a moment, say a few words, offer a small treat or favored toy, *reinforce* cooperative behavior (fig. 1). Second, do not reinforce the disruptive behavior. Turn around, count to 10, or walk away, and then look for any opportunity to reinforce the desirable behavior. This is a straightforward, simplified example of the problem-solving process. However, it is amazing how often this pattern is repeated in a variety of contexts with similar results.

In the case of the regurgitating sea lion, strategies must be devised to address both contributing factors identified in the hypothesis. First, the socialization problem can be dealt with by utilizing a training technique called "cooperative feeding." Operationally, it entails reinforcing two events simultaneously: dominant animals are reinforced for allowing subdominant animals to work and receive food or attention, while the subdominant animals are reinforced for being "brave" enough to work and accept food or attention in the presence of these more aggressive animals. In this case, training would focus on the target animal and the dominant male (fig. 2). Second, the feeding schedule should be altered to make it less predictable. If times of feeds are on a set schedule, extra cooperative feeding sessions should be added in-between. Finally, enrichment strategies should be implemented in-

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Preparing the Farm and Farm Animals for Disasters

by

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INTRODUCTION

Disasters such as hurricanes, tornadoes, floods, earthquakes, severe winter weather, hazardous material spills or nuclear power plant accidents can occur any time. The event may occur suddenly or be anticipated for several days as with an approaching hurricane or flood. The time to prepare for these events is long before they occur. Even at the farm level, procedures should be written. They should be kept in a safe, fireproof, quickly accessible place with other important documents and taken along if it becomes necessary to evacuate the farm. Each member of the farm family and herd personnel should know of and practice the plan so that action may be taken even in the absence of key management personnel.

The first step in planning for a disaster is to determine what type of disaster could occur on the farm and with what frequency. It would be useless to spend time and money, for example, to plan for severe winter weather if the farm is located in a tropical environment. If the premises are near a nuclear power plant, even though the risk of an accident occurring is slim, the owners would want to consider how to protect their animals from radioactive fallout. If the farm is near a major highway, one might want to consider a hazardous material spill from a road accident in the planning. Living next to a river or stream would put planning for flooding or a barge accident in the forefront.

Only after farm owners have considered their risks can they prioritize the time, money, and other resources they wish to allocate to each potential hazard. An all-hazards plan is most desirable; however, plans should also be customized for specific situations. Once the risks are known, decisions can be made about what actions can be taken in advance and what actions would be required once the disaster occurs. Generally, the effects of a disaster on livestock are lessened by avoiding the disaster, mitigating its effect if it cannot be avoided, or sheltering the animals. The approach taken would depend upon the type of disaster anticipated. Sometimes only one approach may be appropriate such as sheltering. In some instances, combined approaches, such as mitigation and sheltering, may be required. In events such as floods or firestorms, sheltering may be the wrong thing to do.

MITIGATION

Hazard mitigation is defined as any action taken to eliminate or reduce the long-term risk to life and property from natural or technological hazards. Some examples of hazard mitigation might be hurricane seeding to reduce the intensity of a storm, tying down homes or barns with ground anchors to withstand wind damage, redirecting the impact away from a vulnerable location by digging water channels or planting vegetation to absorb water, establishing setback regulations so building is not allowed close to the water's edge, and constructing levees or permanent barriers to control flooding.

The farm and farm buildings should be surveyed to figure out what mitigation procedures should be followed based on the hazard risk. These procedures include:

- building or repairing barns and outbuildings so they exceed building codes;
- constructing or moving buildings to higher ground;
- replacing or covering glass windows and doors with sturdier materials;
- keeping drainage furrows sodded;
- cleaning or moving trash piles and burial sites (Many farms contain burial sites contaminated with lead-based paints, machinery grease, motor oil, lead-lined tanks, batteries, roofing nails, asphalt, shingles, caulking compounds, linoleum and plumbing lead. During flooding this material may leech into the crops or feed supply or be moved to a more accessible area where animals could consume them.);
- moving or storing toxic chemicals, pesticides, herbicides, and rodenticides in secured areas to prevent their washing onto pastures where animals may be exposed;
- securing loose items; and
- draining or building levees around ponds that could flood.

A list of resources and people should be developed by the farmer and kept with important papers. This list should contain emergency phone numbers, suppliers, truckers, and people that can help with the animals, especially if normal working conditions are disrupted.

Supplies that may be needed during or after the disaster should be obtained. Many of these items may not be readily available after the disaster. By obtaining them in advance, more reasonable prices will be paid. Unfortunately, disasters attract individuals who gouge and prey on the misfortunes of victims. Items that could be obtained are portable radios and TV's, extra batteries, flashlights, candles, portable generators, salt, gravel, litter, fuel, antifreeze, stored feed such as hay (the amount to store would depend on the hazard—after the Washington State flood, most producers vowed never to inventory large amounts of hay due to excessive flood damage and spoilage), ropes, halters and other animal restraint equip-

ment, and medical supplies. Once obtained they should be stored in such a manner that they will be usable after the disaster. While in storage they should be checked at regular intervals—i.e., once a week—to assure that they do not spoil, and that electrical or mechanical appliances are still working. They should also be rechecked and evaluated after the event to assure they are still usable. A log should be kept to record when and how often the items were monitored. Animals should be kept current on all appropriate vaccinations and booster shots before the disaster. Keep a written record of the products given and the date of injection. Because the stress of the event and the disruption of the environment could cause an increase in infectious disease spread, proper vaccination could protect the animals.

REPRESENTATION TO GOVERNMENTAL AGENCY MANAGING THE DISASTER RESPONSE

As the disaster approaches or after it arrives, the most important thing the farmer needs is truthful, accurate, and current information. Government's response to most disasters is coordinated by a county, State, or Federal emergency management agency. Representation to this agency for the farmer is critical. In most instances, this is competently done by a member of the State or Federal Department of Agriculture. It is strongly suggested that farm organizations lobby for veterinary representation either through their State or Federal Department of Agriculture or separately to the emergency management agency. Often, the needs of animals during disasters are given low priority. Veterinarians, who are aware of these needs and can also verify the validity of requests for help, are most suited to bring animal problems to the forefront. In many instances, actions required to protect animals, such as sheltering or evacuation, must be done before a similar action is taken for people. This is because moving animals to shelter from pasture or evacuating them to other locations takes considerable time and many workers. However, governmental agencies will not issue such directives for animals before similar instructions are issued for people. They fear that a panic situation might occur and people might be critical about animals being protected before them. (Animals can always be released from the shelter or returned from their point of evacuation if the disaster does not materialize.) What they do not consider is that it must be done while it is still safe for people to do the task since animals cannot shelter or evacuate themselves. After the disaster, government usually limits access to the disaster area. However, animals have to be fed, watered, and milked. Who is better suited to do this than the owner? Designation of farmers as emergency workers by government solves the problem of who will be responsible for this task. A veterinarian located in the emergency operating center can get these messages across.

EVACUATION

If evacuation of the animals is being considered, then evacuation procedures, places, and routes should be planned. Since all animals may not be able to be evacuated, owners should decide ahead of time which are the most important ones to save. Various decision criteria can be used such as sale value, breeding quality, stage of pregnancy, stage of production, or simply sentimental preference. These animals should be identified ahead of time and a written list kept. If the owner is not home when the disaster threatens, others would then know which animals to save.

Animal evacuation routes must not interfere with human evacuation routes. Alternate routes should be found in case the planned route is not accessible. Places where animals are to be taken should be decided in advance and arrangements made with the owners of these places to accept the animals. Trucks, trailers, and other vehicles should be obtained in advance and the animals acclimated to them so they are not frightened when they have to be used. Restraint equipment, feed and water supplies should be available to use and move with the animals and sufficient people should be on hand to help move them. The animals should be photographed and permanently identified by metal eartag, tattoo, brand, registration papers, or microchip. A permanent record of the identification must be kept as this information is useful in resolving arguments of ownership in case animals gets loose. Papers documenting the identification should be kept with other important papers. Ultimately, the decision to evacuate will depend on the distance to be traveled, the amount of time before the disaster will affect the farm, and whether there is any advantage to moving the animals to the place selected. Sometimes evacuation may be done after the disaster, provided the roads are passable and the equipment needed for travel usable. If this is the case, the accepting location must be contacted to find out its condition.

SHELTERING

Whether to move farm animals to shelter or leave them outside will depend on the integrity and location of the shelter being used and the type of disaster. During Hurricane Andrew, some horses left outside suffered less injury then those placed in shelters. This was because some shelters selected did not withstand the high winds. Horses were injured by collapsing structures and flying objects that may have been avoided on the outside. Another reason for possibly leaving animals unsheltered is because flood waters that inundate a barn could trap animals inside, causing them to drown. During severe winter weather, shelter animals from icy wind, rain, and snow. Generally, if the structure is sound, the animals should be placed indoors. Once they are inside, secure all openings to the outside. As mentioned previously, the sheltering should be ordered and completed before similar action is taken for humans.

Farm cats and dogs should either be placed in a disaster-proof place or turned loose, as they generally will stay close to their home in the immediate period following a disaster. If they are loose, however, attempts must be made to immediately catch them after the

threat is over to prevent these animals from becoming feral and a public health hazard. Some farm dogs are dangerously aggressive, and under normal circumstances should be kept chained. These dogs cannot be kept chained or turned loose during a disaster. If an inside shelter cannot be found, then the only safe and humane thing to do is to euthanize these dogs as a last measure before evacuation.

HUMAN EVACUATION

What can be done with the animals if there is a need to evacuate the premises and the animals have to be left unattended? There is always the risk that animals left unattended for extended periods could die or suffer injury. Sometimes, this may be the only option to protect human life. Protecting human life should always take priority in planning. Regardless, after the animals are secured in appropriate shelters, food and water should be left for them. The amount necessary for survival is considerably less than for other purposes. If the animals survive, then the decision can be made after the disaster whether it is worth the time and expense to bring them back to their previous condition.

Consult the table as a guide to the amount of food and water to leave. Every practical effort should be made to leave animals with sufficient food and water for their survival – enough for 48 hours should be left. Usually, within that time the initial effects of the disaster will be over. During the recovery phase, the decision can then be made as to the best way to mount a rescue effort.

SPECIAL CONSIDERATIONS

Some practices that may be followed in planning for disasters, especially during the winter, require a special alert. During winter weather it is common to use portable heaters, gritty substances on the floor to prevent slipping, and antifreeze. When using these heaters, be sure they are working properly and are located in an area where there is adequate ventilation. Heaters not working correctly could be a source of carbon monoxide, a deadly, odorless, colorless gas. Antifreeze used in vehicles is a deadly poison. Animals seem attracted to it and will readily

Short Term Dietary Requirements for Animals During Disasters

ANIMALS	WATER/DAY	FEED/DAY
DAIRY COWS:		
In Production	9 gallons summer 7 gallons winter	20 pounds hay
Dry Cows	9 gallons summer 7 gallons winter	20 pounds hay
Weaning Cows	6 gallons summer 3 gallons winter	8-12 pounds hay
Pregnant	7 gallons summer 6 gallons winter	10-15 pounds legume hay
Cow with Calf	9 gallons summer 8 gallons winter	12-18 pounds legume hay
Calf (400 pounds)	6 gallons summer 4 gallons winter	8-12 pounds legume hay
SWINE:		
Brood sow with litter	4 gallons summer 3 gallons winter	8 pounds grain
Brood sow (Pregnant)	1-2 gallons summer 1 gallon winter	2 pounds grain
Gilt or Boar (150 pounds)	1 gallon	3 pounds grain
SHEEP:		
Ewe with lamb	1 gallon	5 pounds hay
Ewe, dry	3 quarts	3 pounds hay
Weanling Lamb	2 quarts	3 pounds hay
POULTRY:		
Layers	5 gallons/100 birds	17 pounds/100 birds
Broilers	5 gallons/100 birds	10 pounds/100 birds
Turkeys	12 gallons/100 birds	40 pounds/100 birds
HORSES:		
All Breeds	5 gallons/1000 pounds	20 pounds hay/1000 pounds
DOGS AND CATS:		
All Breeds	1 quart/day/animal	ad libitum dry food

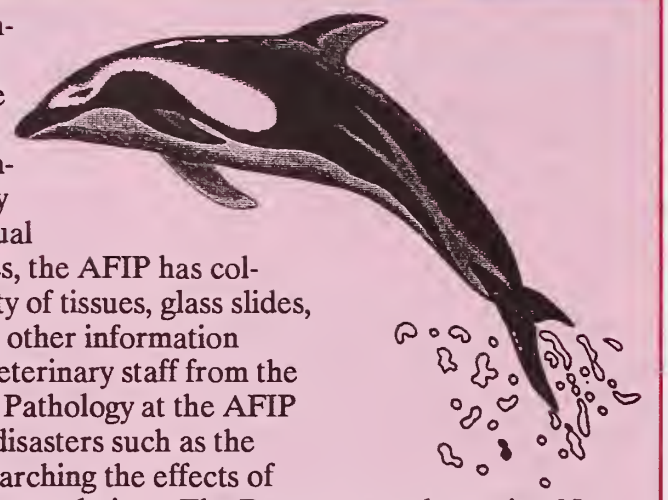
consume it because of its sweet taste. Take care to properly label all containers. Do not use containers previously filled with antifreeze for other purposes, especially feed and water. Promptly clean up all leaks and spills. Water supplies should be checked for freezing. Many animals have died of thirst during the winter, even with abundant water sources, because they could not drink the water as it was frozen solid. If gritty material is spread on floors to prevent slipping, use only approved nontoxic materials. Recently, a farmer mistakenly used Furadan, a fungicide, for this purpose and several cows who licked it off the floor died.

Farms can be insured against catastrophic events. Insurance policies are available for replacement of damaged materials, repair work for recovery, boarding of evacuated occupants and animals, lost production, and relocation. These should be investigated and purchased before the disaster threatens. For a farmer to claim compensation for lost production, which in many cases is the largest economic cost during a disaster, the farmer must have substantial records that document the level of production his/her herd has achieved in previous years. This is generally only successful in herds with recognized herd monitoring programs, such as Dairy Herd Improvement or other programs that are available for various species. To verify the validity of these records a herd health program, based on a valid veterinarian-client-animal relationship, should be in place. A copy of all production records should be kept in a secure place so that the details are not lost during the disaster. Many veterinarians are willing to keep copies of their clients' production records, if they are computerized and space efficient.

CONCLUSION

Depending upon the event, disaster preparation may or may not be successful. However, it is known that effects of disasters are lessened by proper planning. Economically, it is cheaper to prevent the problem or lessen its effect than to pay the costs of recovery. The time to do this is NOW, before the disaster occurs. ■

MARINE MAMMAL DATABASE



The Armed Forces Institute of Pathology (AFIP) is the largest single repository of pathologic material from marine mammals. Having become a key diagnostic center for unusual marine mammal mortalities, the AFIP has collected a substantial quantity of tissues, glass slides, blocks, Kodachromes, and other information regarding these species. Veterinary staff from the Department of Veterinary Pathology at the AFIP assisted at environmental disasters such as the *Exxon Valdez* oil spill, researching the effects of contamination on sea otter populations. The Department also assists National Marine Fisheries Service (NMFS) with investigation of unusual marine mammal mortalities or endangered species mortalities such as the Hawaiian monk seal. Information acquired from wild and captive populations has been archived and catalogued in the AFIP natural language (PANLARS) system of records that encompasses animal and human cases from as early as the 1800's. The Registry of Comparative Pathology and the Department of Veterinary Pathology have initiated compilation of these extensive marine mammal resources into the "The Marine Mammal Database." This database is accessible through computer-based networks to students, veterinarians, scientists, conservation organizations, and other interested individuals and institutions. The materials listed in the database are available for study and comparative research purposes.

Subject material included in the database encompasses parasitic, bacterial and viral infections, in addition to neoplasia and congenital conditions observed in captive and free-ranging marine mammals. A wide variety of species is represented in the database. Pinnipeds and cetaceans comprise the major portion of cases, but information on select families such as mustelids and sirenians also is available.

The database may be queried via subject, animal species, organ system, disease, or condition. Information accessed through the database includes a brief description of the condition, diagnosis and a list of the types of material (slide, tissues, reports) available for reference. A unique accession number is provided for each of the case materials available for study.

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Surgery in Rodents: Risk of Potential Hypo- and Hyperthermia

by
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In the recent article "Applying Principles of Aseptic Surgery to Rodents" [*Animal Welfare Information Center Newsletter* 4(2):3-6], T. L. Cunliffe-Beamer gives comprehensive guidance on the topic of the paper and points the reader's attention to a number of little "know-how" techniques to minimize or prevent various complications of surgery and perioperative infection in laboratory rodents. My letter focuses on one of the potential problems of any rodent surgery, i.e., on what Cunliffe-Beamer termed "hypothermia from anesthesia."

It is true that anesthesia often results in a decrease in body temperature (Tb). In this situation, however, the term "hypothermia" does not explain the nature of the thermoregulatory disturbance during and after narcosis and, moreover, may easily direct someone to a wrong strategy of preventing this disturbance. Such a mistake, as I will explain below, may result in the animal's death. Therefore, this problem is worthy of being discussed.

It is well documented that an important (if not "the important") factor in the development of anesthesia-associated falls in Tb is the modification of the character of Tb regulation (Sessler, 1991). In intact, unanesthetized animals, cold-defense effector mechanisms are activated as soon as a minimal decrease in Tb develops, and heat-defense effectors are activated as soon as Tb rises by a minimal value. Therefore, under normal circumstances, the threshold Tbs for activation of cold- and heat-defense mechanisms practically coincide (the interthreshold zone varies from 0 to 0.5°C). As a result, an intact homeothermic animal precisely regulates its Tb by immediately reacting in the appropriate way to any slight downward or upward deviation of Tb.

In anesthetized animals, a homeothermic type of Tb regulation changes to a poikilothermic one. An animal becomes nonresponsive to either a decrease or an increase in its Tb, unless the magnitude of the Tb deviation is very large. It has been reported that the interthreshold zone during anesthesia may easily reach 4°C and that such a widening of the interthreshold zone develops not only by decreasing the threshold Tb for activation of the cold-defense mechanisms, but also by increasing the threshold Tb for activation of heat-defense (Sessler, 1991). Such factors as operation trauma (Stoner, 1991) and, at late stages of postoperative recovery, fever (Vybíral, et al. 1987) may also contribute to the development of poikilothermia after surgery. Under these circumstances, Tb becomes the result of the passive heat transfer between the organism and environment within a wide interthreshold zone, Tb dependency on ambient temperature becomes markedly stronger and fluctuations in Tb easily become enlarged. In other words, anesthesia-associated poikilothermic Tb regulation may result in hypothermia (which usually happens due to multiple reasons, partly mentioned by Cunliffe-Beamer, i.e., ambient temperature below thermoneutral, exposed body cavities, increase in exposed body surface during operation, etc.). However, the same type of Tb regulation may easily result in hyperthermia (e.g., when the animal is heated after an operation). Unfortunately, postoperative overheating constitutes more than hypothetical danger: I know a colleague who has had the sad experience of losing a group of three guinea pigs during immediate postoperative recovery under a heating lamp after a relatively simple surgical procedure. Cunliffe-Beamer's recommendation to position a heat source so that the rodents can move away from it as they recover from anesthesia may not be efficient in preventing overheating since anesthesia-associated poikilothermia is characterized not by the inability of the effectors to lose heat, but rather by the "unwillingness" of the animal to respond to a heat load. Moreover, after an animal becomes hyperthermic, it has much less chance to escape since hyperthermia by itself may induce poikilothermia (Romanovsky and Blatteis, 1993).

In conclusion, surgery in rodents is accompanied by the development of poikilothermia, which usually results in hypothermia. To prevent or minimize the hypothermia, animals must be kept warm during and after surgery. Depending on animal species, type of surgery, anesthetic(s) used, etc., different protocols of heating may be followed. As a general rule, however, such heating must be very mild and controlled very carefully. The animals must be, at least periodically, watched throughout the recovery. Otherwise, there is a potential danger of overheating, which may lead to the animal's *exitus letalis*.

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between feeds to provide activity options other than regurgitation.

4. Check the results. There are no pat answers or guarantees in dealing with behavior, problematic or otherwise. It is dynamic in nature, and so much of what we do is guesswork. However, there are two processes that increase the likelihood of making the right guesses. First: the quality and extent of information gathered prior to initiating any work—the data collection phase. That, coupled with knowledge of the individual animal, makes a carefully developed hypothesis an *educated* guess. Second: an on-going evaluation of information you get back from the activity. Is a particular strategy achieving the results that are anticipated? If the answer is yes, it's a good bet to stay with the current strategy. If the answer is no, it's time to reevaluate and perhaps try something else.

5. Adjust strategies if necessary. It is critical to maintain a realistic expectation of results, so a strategy is not abandoned too quickly, or sustained too long. If that occurs, the result can be a great deal of frustration and confusion for the animal, which may worsen the problem. When one approach has been tried for a sufficient length of time (a critical judgment call) without the desired results, try something else. Then, check results again, and continue to adjust strategies as necessary. In tough cases, it may be necessary to try several different strategies before one works. Or often, it will be a combination of strategies that finally achieves the desired results. That's why good behavioral management skills include a heavy dose of creativity, innovation, and most important, flexibility.

The following are some specific examples of how behavioral management strategies have been used to decrease or eliminate abnormal behaviors.

Figure 2. Training can address socialization issues which are often contributing causes to abnormal behavior.

Figure 3. Drill grooming behavior increased as a result of training

Over a period of 7 months, a pilot behavioral project was conducted with a group of drill baboons (Desmond, et al., 1987). The primary goal of the project was to increase positive social interactions and reproduction among the group members (fig. 3). There was also concern about a sub-adult male who had been introduced to the group 6 months previously and was shunned by them. He often appeared stressed, and exhibited some abnormal behavior. Intervention was difficult due to the social dynamics within the group which made him and other subdominant animals inaccessible to the keepers for handling or husbandry purposes.

A thorough information-gathering process was conducted, which included interviews with relevant personnel and assessment of behavioral observation data conducted on the group for the previous 2 years. Based on this information, a hypothesis was formulated. The hypothesis was that a long-term moderate state of sensory deprivation had existed in the exhibit. This shortage of stimulation had resulted in subtle competition among group members which, in turn, inhibited breeding, other positive social interactions, and interest in interacting with the environment. It also contributed to the presence of problematic behaviors by all group members including fence nibbling,

self-biting, and examining and eating feces.

Based on this hypothesis, the following behavioral goals and strategies were developed:

1. Increase overall sensory stimulation of the group through regular training sessions.

2. Increase positive social interactions in the group by cooperatively feeding animals in different dyads and triads, reinforcing them for eating and relaxing in close proximity to one another.

3. Increase keeper access to individual animals by establishing feeding stations and targets to control food intake, the movement of animals, and achieve voluntary separation.

Although reducing abnormal behaviors was a goal, the training strategies were developed to address the underlying *causes* of these behaviors - insufficient sensory stimulation, and socialization problems. Operationally, the young male was often paired with an adult female for cooperative feeding sessions. She was reinforced for "staying" while he was given food and personal attention. He learned to gently touch the trainer's hand and arm, approximating grooming. He slowly became less nervous and agitated when eating with the female, and increasingly more relaxed. Prior to this project, he had been observed biting his leg in a manner and frequency that indicated the potential onset of neurotic behavior. Keepers familiar with the exhibit reported a significant reduction in the observance of the behavior throughout the training project.

Documented results (table 1) showed significant increases in all forms of positive, social interactions during and following the project (Cox, 1987). Reduction in all forms of abnormal behavior was also achieved (table 2).

Another project illustrating the process of addressing abnormal behaviors involved a captive-born Bottlenose dolphin named Pepe (Laule, 1984). Living with a couple of other young animals, two separate attempts were made to integrate him into a larger social grouping of show animals. These attempts were unsuccessful, and in the process he developed several abnormal and problematic behaviors. These included an erratic appetite and attention span; biting people during unstructured play sessions; habitual regurgitation; and chronically swallowing objects that fell into the water.

In researching Pepe's situation and history, several factors were identified which may have contributed to the development of these problem behaviors. First there were health-related problems, including the presence of small ulcers which could have affected his appetite and energy level. He had also sustained an injury to his peduncle area, which caused occasional swelling and which was under constant scrutiny. This was later diagnosed to be osteomyelitis and a source of his chronically high white blood cell counts.

Another factor was his submissive behavior. Whenever he was introduced into the larger social group, despite his greater size, Pepe always aligned himself with the subdominant males and quickly became the lowest ranking animal. In that weak position, pressures were placed on him that he was apparently unable to cope with.

Differences in training regimen from one condition to the other may have also been a factor. These changes included the loss of his one primary trainer and subsequent replacement by four new individuals. Behavioral charts indicate that in the second condition he was worked inconsistently, less often, and with less challenging work. In a period of almost 2 years, he learned only one new behavior while losing several others. He also received less personal attention.

One last factor concerns the age at which Pepe was separated from his mother, and the impact that may have had on his subsequent development. Compared to the

TABLE 1 EFFECT OF TRAINING ON DRILL SOCIAL BEHAVIOR

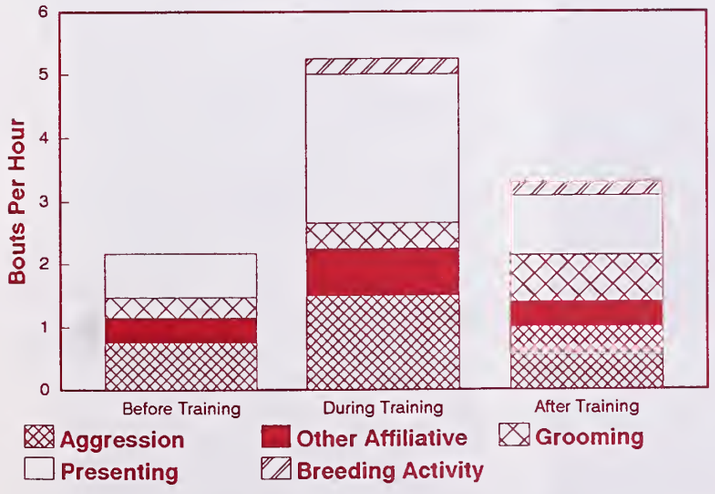
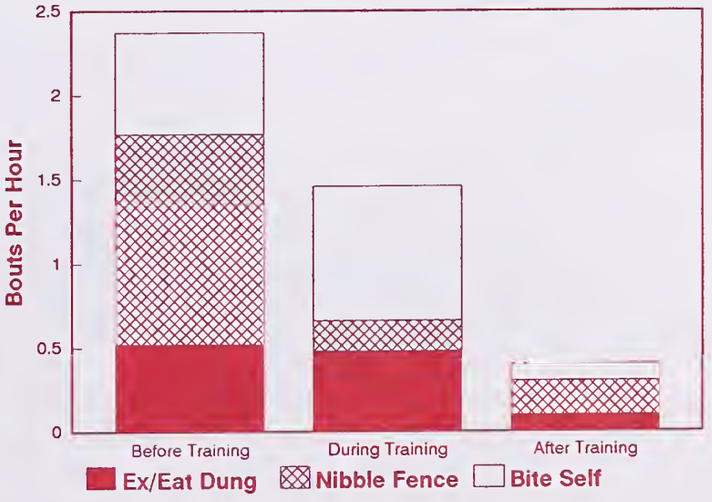


TABLE 2 EFFECT OF TRAINING ON ABBERANT DRILL NONSOCIAL BEHAVIORS



Note: Although aggressive behavior increased on an absolute level from before training to during training, it dropped from 34% to 25% of the total social interaction.

other five dolphins born at the park, Pepe's separation from his mother, at 18 months, was at a substantially earlier age. The average age of the other five animals was 29 months, with the youngest being 26 months and the oldest 33 months.

Although I found no definitive research or conclusions on optimal age of separation, Herman notes, in his book *Cetacean Behavior*, "Close affiliation between the newborn and mother continues for an extended period of time and dependency may persist even into adulthood" (Herman, 1980). Whether this had an impact on Pepe's later problems is uncertain. Nonetheless, it is noteworthy, in light of the extensive research done by John Bowlby on early separation of young human children from their mothers and the far-reaching effects this has on personality and behavioral development (Bowlby, 1973).

Once the potential causes and contributing factors were identified, a variety of strategies were employed to address each of the problematic conditions. Because of his delicate health, he was the first dolphin to be trained to present his tail flukes for blood sampling, and to accept a stomach tube and fecal tube insertion for sample collection. With his voluntary cooperation, it was easier and less stressful to perform these procedures and monitor his health on a regular and frequent basis.

To help stabilize his eating habits, and to curb his throwing up, different feeding schedules were employed. For a period of 2 weeks, Pepe was fed twice nightly to increase his appetite and weight. Little change was noted. Next, a schedule of eight feeds per day was begun which continued for approximately 2 months. His normal diet was fed in small amounts over the course of the day, with at least three of the feeds being training sessions. Accurate charts were kept, listing the time of day, number of pounds fed, and the amount, if any, of regurgitation seen. This provided a clear picture of Pepe's eating and regurgitating habits, and the evidence of change when it did occur. Specific intervention for the regurgitation included using a verbal "no" and short time out when Pepe would regurgitate during or after his feeds. Extra time was spent with him immediately following a feed, during which time he was rewarded with attention and play for not regurgitating.

To address both the problem biting and his habit of swallowing foreign objects, desensitization work was initiated to train him to allow us to touch his mouth, tongue, and teeth, without biting. At the same time, he was trained to retrieve safe objects like paper cups or paper towels, and then let us open his mouth and remove the objects from his mouth or throat. Third, with a trainer in the water with him, work was begun with Pepe, reinforcing him for gentle play and non-biting behavior. The reinforcement was high at first, then slowly reduced until reinforcement was no longer necessary at all.

To assist in his socialization, he was specifically worked with each of the dominant animals. Pepe was encouraged and rewarded for participating in these sessions, while the dominant animal was rewarded for allowing him to do so. Conversely, if Pepe did not work, reinforcement was withheld from the other male until he did.

Other behavioral strategies included maintaining consistency of trainers, keeping the number of daily training sessions high, and balancing sessions between individual work and work with other animals. Special care was also taken to provide Pepe with a lot of personal attention (fig. 4).

Finally, Pepe was moved to a different show area with four other animals. From the first day, consistency in trainers was maintained by having myself or another familiar trainer with him everyday. For the first 2 weeks, we spent all of our extra time with Pepe, just sitting with him, rubbing him down, or playing. For 2 months, we were present during shows and training sets to work exclusively with him. Concurrently, the other animals were reinforced for allowing Pepe to work, and any positive social interactions were reinforced.

The results of these strategies were quite encouraging. Pepe was successfully integrated into the show. Socially, he appeared comfortable, interacting with all of the other animals and developing a strong bond with the female pilot whale, each displaying imitative behavior learned from the other.

His biting stopped completely. He would allow us to open his mouth and remove any objects. Rubbing his mouth and tongue became his favorite tactile behavior. In fact, Pepe's overall responsiveness to people increased tremendously. He would now seek atten-

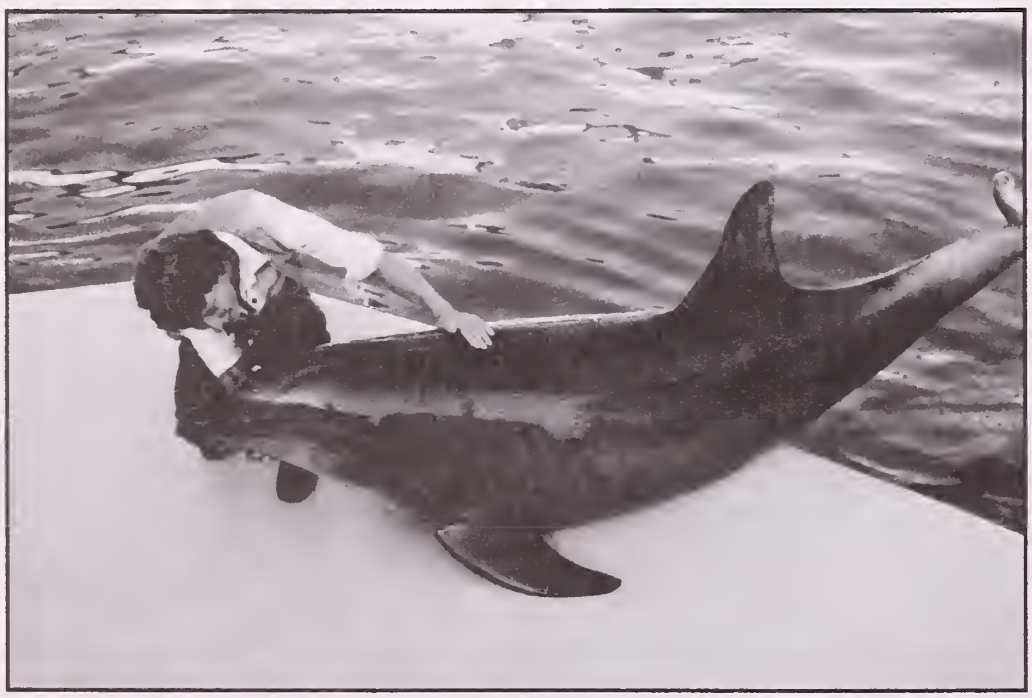


Figure 4. Pepe received extra personal attention during interventions to address abnormal behaviors.

tion and interact gently and non-aggressively. His retrieval work improved, so that he would voluntarily return an item he found to the trainer, or retrieve a specific object we pointed to.

His throwing up almost completely disappeared, with only an isolated occurrence being noted. His appetite and attention span, although occasionally erratic, improved greatly overall. He maintained his repertoire of behaviors and continued to learn others.

The examples I described were ambitious attempts to address and resolve a complex set of problematic behavioral issues. These efforts required an investment of time and effort that may not be practical or possible in many situations. However, what is applicable to every situation is the *process*. It doesn't have to be complicated and tedious, but to some degree it has to be done. Abnormal behavior is not a simple problem, and there are rarely simple solutions. The greatest success in dealing with abnormal behavior will come from addressing the causes of the problem, not just the problem behavior itself. With that approach, there are often simple things that can be done to positively impact the situation to some degree (Bayne, et al., 1993).

Behavior is an acknowledged indicator of well-being (Petto et al., 1990). When we strive to provide optimal care for captive animals by providing for their physical and psychological well-being, reducing or eliminating abnormal behavior is an issue that cannot be overlooked or shortchanged.

For further information contact
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Ventura, CA 93001
Phone (805) 650-6464
Fax (805) 650-6467

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Legislation cont'd from p.1

18, United States Code, is amended to outlaw the use of mail or any facility in interstate or foreign commerce, for the purpose of causing physical harm to another person or to the property of another person, in order to prevent that person from participating in an animal enterprise or retaliating against that person for participating in an animal enterprise.

- **H.R. 3271 To amend title 18, United States Code, to provide penalties for willfully harming law enforcement animals.**

Introduced October 13, 1993, by Elton Gallegly (R-CA) and referred to the Committee on the Judiciary. This act may be cited as the "Federal Law Enforcement Animal Protection Act of 1993."

Chapter 65 of title 18, United States Code, is amended to include the following: "Whoever willfully kills, harms, or attempts to kill or harm any animal being used by any Federal law enforcement officer in the discharge or attempted discharge of that officer's duties shall be fined under this title, imprisoned not more than five years or both."

- **H.R. 3300 To amend the act popularly known as the "Sikes Act" to enhance fish and wildlife conservation and natural resources management programs on military installations.**

Introduced October 19, 1993, by Gerry E. Studds (D-MA) and referred to the Committee on Merchant Marine and Fisheries. This act may be cited as the "Natural Resource Management on Military Lands Act of 1993."

The Secretary of Defense shall prepare and implement for each military installation in the United States an integrated natural resources management plan. Plans should address wetland protection and restoration, and wetland creation where necessary to support fish or wildlife; establishment of specific natural resource management goals, objectives, and timeframes for proposed actions; needs for fish and wildlife management, land management, forest management, and wildlife-oriented recreation, and provide for professional enforcement of natural resource laws and regulations.

- **S. 1343 Entitled the "Steel Jaw Leghold Trap Prohibition Act."**

Introduced August 3, 1993, by Daniel K. Akaka (D-HI), and referred to the Committee on Environment and Public Works.

It is the policy of the United States to end the needless maiming and suffering inflicted upon animals through the use of steel jaw leghold traps by prohibiting the shipment in interstate or foreign commerce of the traps and of articles of fur from animals that were trapped in the traps. It is unlawful for any person to knowingly import, export, ship or receive any article of fur from an animal trapped in a steel jaw leghold trap; or to deliver, carry, transport, ship, sell, receive, acquire, or purchase any steel jaw leghold trap.

- **S. 1427 To provide the necessary authority to manage the activities in Antarctica of United States scientific research expeditions and United States tourists, and to regulate the taking of Antarctic marine living resources and for other purposes.**

Introduced August 6, 1993, by John F. Kerry (D-MA) and referred to the Committee on Commerce, Science, and Transportation. This act may be cited as the "Antarctic Scientific Research, Tourism, and Marine Resources Act of 1993."

Sec. 15 outlines amendments to the Antarctic Marine Living Resources Convention Act of 1984 that strengthen the act's protection of indigenous plants and animals from harmful interference through either the taking of indigenous species or introduction of nonindigenous species (i.e., dogs). The act also addresses environmental assessment plans, and waste disposal from ships.

- **S. 1440 To amend the Endangered Species Act of 1973 with common sense amendments to strengthen the act, enhance wildlife conservation and management, augment funding, and protect fishing, hunting, and trapping.**

Introduced August 6, 1993, by Conrad Burns (R-MT), and referred to the Committee on Environment and Public Works. This act may be cited as the "Common Sense Amendments for All Endangered Species Act."

The Secretary of the Interior shall evaluate the listing of any species as threatened or endangered and the designation of critical habitat. The evaluation process shall include notifications of the appropriate State of local agencies responsible for the conduct and oversight of fish or wildlife management practices, and notice and conduct of a hearing in the vicinity of the proposed action. The Secretary shall by regulation establish criteria by which to determine whether any fish or wildlife stock constitutes a subspecies or distinct population segment, or plant stock constitutes a subspecies, so as to be eligible for listing as a threatened or endangered species. The criteria shall include a requirement that genetic data analysis be employed where or when such data are available and shall establish a reasonable burden of proof for determinations of subspecies and distinct population segments. Related bills, S. 1521, October 1993; H.R. 1490, March 1993;

S. 3159, August 1992; H.R. 4045, November 1991.

- **S. 1521 To reauthorize and amend the Endangered Species Act of 1973 to improve and protect the integrity of the programs of such act for the conservation of threatened and endangered species, to ensure balanced consideration of all impacts of decisions implementing such act, to provide for equitable treatment of non-Federal persons and Federal agencies under such act, to encourage non-Federal persons to contribute voluntarily to species conservation, and for other purposes.**

Introduced October 6, 1993, by Richard C. Shelby (D-AL), and referred to the Committee on Environment and Public Works. This act may be cited as "Endangered Species Act Procedural Reform Amendments of 1993."

The Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) is amended by adding a request for peer review before determining that a species is threatened or endangered, or designating critical habitat. Other amendments include improvements in data collection and analysis to make determinations about a species status, and ensuring the preparation and use of timely, comprehensive, and effective recovery plans. Recovery plans must consider the biological significance of the species, geographical range of the species, current population, technical practicality of recovering the species, conservation measures, captive breeding programs, and socioeconomic impacts that may result from listing the species as threatened or endangered, including a description of the direct and indirect costs to the public. Related bills, H.R. 1490, March 1993; S. 3159, August 1992; H.R. 4045, November 1991.

- **S. 1526 To improve the management of Indian fish and wildlife and gathering resources for other purposes.**

Introduced October 7, 1993, by Daniel K. Inouye (D-HI), and referred to the Committee on Indian Affairs. This act may be cited as the "Indian Fish and Wildlife Resources Management Act of 1993."

The purposes of the act are to reaffirm and protect Indian hunting, fishing, trapping, gathering rights, and to provide for the conservation, prudent management, enhancement, orderly development and wise use of the resources upon which Indian rights depend; to enhance and maximize tribal capability and flexibility in managing fish and wildlife resources; to authorize and establish Indian bison ranching demonstration projects, the Indian Fish and Hatchery Assistance Program, and the Wildlife Resource Management Education Assistance Program. Related bill, H.R. 2874, August 1993.

Cynthia Smith, Info. Specialist

Announcements...

- **ANNOUNCEMENT FOR JOURNAL PUBLICATION**

A summer course on ethical issues of animal experimentation will be held July 9-13, 1994, on campus at Georgetown University, Washington, D.C. The course, funded by the National Science Foundation, is open to college faculty who would like to improve their skills in teaching ethical issues surrounding animal experimentation to graduate and undergraduate students in their home institutions. Emphasis will be on how to use course materials in classroom instruction. Topics include the moral status of non-human animals, the justifications for using animals in research and education, student objections, the use of alternatives, animal harms and pain, legal issues, and the importance of species. Varying points of view will be presented in a well-balanced fashion. The course directors are F. Barbara Orlans, PhD, Tom L. Beauchamp, PhD, of the Kennedy Institute of Ethics, and Alan I. Faden, MD, School of Medicine, Georgetown University. Scholarships are available. FOR MORE INFORMATION: Contact Marc Favreau, Kennedy Institute of Ethics, Georgetown University, Washington, DC 20057. Tel: 202-687-6771, FAX: 202-687-6770.

- **AMNET NEWS AND INFORMATION RESOURCE**

AmNet is a non-profit, all-volunteer organization. AmNet's mission is to promote positive ethical concepts in our relationship with animals and the environment. We believe that with adequate information, the public will bring about the end to detrimental animal and environmental exploitation.

What Does AmNet Do?

Research and information services to students. Lesson plans and educational materials are available to teachers and students on a variety of topics, e.g., pet overpopulation, farming, vegetarianism, and wildlife issues. A library of print and audiovisual materials is maintained for public use.

Cooperation Through Telecommunications

If you have a personal computer and a modem, **AmNet On-line** will let you talk, plan, and work with like-minded people throughout the United States and many countries overseas. **AmNet News Service** provides a news feed to other computer networks around the world.

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• NORINA - (A NORWEGIAN INVENTORY OF AUDIOVISUALS)

The Laboratory Animal Unit, Norwegian College of Veterinary Medicine, Oslo, in collaboration with Richard Fosse, Laboratory Animal Services, University of Bergen, has just completed the first version of an English-language database of audiovisuals for use in the biological sciences. The primary purpose of NORINA is to offer an overview of possible alternatives or supplements to the use of animals in student teaching, at all levels from schools to universities. The database consists at present of around 1,300 entries, including computer programs, interactive video, films, and more traditional teaching aids such as slide series, 3-D models and classroom charts. There is also a section for Contact Persons who are developing and/or using audiovisuals at their institution, and for suppliers of audiovisuals. Entries in NORINA have been collected from all over the world, and the base will be continuously updated in the future. We invite users, developers, and suppliers of audiovisuals to send in details for future upgrades of the database.

NORINA has been written in Filemaker Pro, originally for Macintosh, but now also available for IBM Windows. It is also available as a stand-alone IBM version. Price: NOK 950 (U.S. $130) (for networks with up to 30 work stations: NOK 4,750 (U.S. $650)).

For more information, contact: Professor Adrian Smith, Laboratory Animal Unit, Norwegian College of Veterinary Medicine,

P.O. Box 8146 Dep., 0033 Oslo 1, Norway. Fax: +47 22 96 45 35. Phone: +47 22 96 45 74. E-mail (Internet): adrian.smith@veths.no

• NEW BOOK ON HUMANE CARE AND USE OF ANIMALS

Principles of Laboratory Animal Science: A Contribution to the Humane Use and Care of Animals and to the Quality of Experimental Results edited by **L.F.M. van Zutphen, V. Baumans** and **A.C. Beynen,** *Rijksuniversiteit te Utrecht, The Netherlands*. Published by ELSEVIER SCIENCE PUBLISHERS, May 1993.

It is now widely recognized that education and training in laboratory animal science are essential for the humane use of animals for scientific purposes and for the quality of results. This book contains basic facts and principles covering the main theoretical aspects of this subject, encompassing welfare as well as ethical issues. After a general introduction and a glimpse into legislation, information is presented on the biology and husbandry of the most frequently used animal species and the relationship between behaviour, stress, and well-being. The book also covers aspects of standardization, diseases of laboratory animals and their effect on welfare and experiment results, recognition of pain and distress, anaesthesia, the possibilities and limitations of the use of alternatives and the ethics of animal experimentation.

This book should be of value as a handbook for all those involved directly or indirectly in the care and use of laboratory animals.

Send your order to your bookseller or write:
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• ADOPT A MANATEE AND GET INVOLVED

Boomer, Brutus, Howie, Success, and Phyllis. Right now, these may only be names to you, but each name belongs to an endangered manatee with a distinct personality. Each manatee named has thousands of adoptive "parents" across the United States and internationally. Through Save the Manatee Club's (SMC) Adopt-A-Manatee program, people can get to know manatees and help save them from extinction.

Twenty-three manatees that live in the wild have been chosen as adoptees for SMC's Adopt-A-Manatee program. Each of the animals has a known history and, in some instances, has been tracked by U.S. Fish and Wildlife Service researchers. The manatees in SMC's adoption program regularly winter at Blue Spring State Park near Orange City, Florida, where the natural spring maintains a constant 72-degree temperature.

SMC annual memberships start at $15 for individuals. When someone adopts a manatee, that person becomes a member of the Club. Each member receives a picture of "their" manatee, the manatee's history, an adoption certificate, education information about manatees in general, and the SMC Newsletter five times a year. Wayne Hartley, a State ranger at Blue Spring, writes updates on the adoptees for each issue of the SMC Newsletter. Says Hartley, "Once, few people were aware the manatee existed, let alone in trouble. Now people in Montana, Boston, Panama, and Germany are aware of manatees. I credit Save the Manatee Club with most of that!"

The Adopt-A-Manatee program was started in 1984 by former Florida Governor Bob Graham (now a U.S. Senator) and singer Jimmy Buffett, Co-Chairman of Save the Manatee Club's Board of Directors. SMC was started so that the general public could participate in conservation efforts to help save the endangered manatee. Funds raised from the Adopt-A-Manatee program go toward public awareness, education, research, and lobbying efforts for the manatee.

For further information contact: Nancy Sadusky at 1-800-432-JOIN or write Save the Manatee Club, Inc., 500 N. Maitland Ave., Maitland, FL 32751.

• COURSE ON LABORATORY ANIMAL SCIENCE - UTRECHT

A 2-week intensive course on laboratory animal science will be held at the Department of Laboratory Animal Science - Utrecht, The Netherlands, on June 6-17, 1994.

The objective of this course is to present basic facts and principles that are essential for the humane use of animals and for the quality of research.

The contents of the course are in line with recommendations of the Federation of European Laboratory Animal Science Associations (FELASA) regarding the training of the young scientist whose research involves the use of vertebrate animals.

The course may also be of interest to those who intend to set up a similar course at their location. For this purpose, during the course the acquisition of teaching materials can be discussed with the course committee.

For information and application forms, please contact:
Marianne Albers
Department of Laboratory Animal Science,
Faculty of Veterinary Medicine, P.O. Box 80.166
3508 TD Utrecht, The Netherlands
TEL: 31-30-532033
FAX: 31-30-537997 ■

Grants, Fellowships....

• CENTER FOR ALTERNATIVES TO ANIMAL TESTING (CAAT)

The Johns Hopkins CAAT is soliciting proposals for the 1995-96 grant period. These research proposals should provide fundamental knowledge needed to develop alternative methods to the use of whole animals for the safety/hazard evaluation, risk assessment and efficacy of commercial products.

We encourage the investigation of *in vitro* approaches to evaluating cellular and target organ toxicity. Some examples are: developing new cell culture systems, applying current testing methodology to human cells/cell lines, and designing new, mechanistic, state-of-the-art methods that may use cultured cells, computer technology (e.g., structure-activity relationships), or any other system applicable to toxicity/efficacy evaluation. At present, CAAT does not fund projects relating to carcinogenicity or mutagenicity.

To apply, submit a 1 page preproposal abstract using the CAAT Preproposal Abstract Form (95-96) to: Ann Kerr, CAAT, 615 N. Wolfe St., Baltimore, MD 21205, Tel: (410)955-3343 FAX: (410)955-0258. Deadline for submission of preproposal abstracts is March 1, 1994.

• INTERNATIONAL FOUNDATION FOR ETHICAL RESEARCH (IFER)

IFER is seeking proposals for the 1995 grant period. The Foundation's interests and priorities are valid alternatives to the use of live animals in research, testing, and teaching. These alternatives must take into account the traditional three R's, of refinement, reduction, and replacement, plus the fourth R that IFER is unique in adopting – Responsibility.

Examples of areas of interest include: tissue, organ, and cell cultures, bacterial cultures, GC/Mass Spectrophotometry, radioimmunoassay, math and computer models, quantum pharmacology, mechanical models and clinical and epidemiological surveys.

For more information, contact: IFER, 53 W. Jackson Blvd., Suite 1552, Chicago, IL 60604 Tel: (312) 427-6025. Deadline for submission of preproposals is August 1, 1994.

• NATIONAL SCIENCE FOUNDATION (NSF) – CORRECTION

AWIC Newsletter V.4 #3 contained incorrect information on grants from the NSF Biological Basis of Behavior Program. The following information replaces that announcement. The NSF has many programs of interest to researchers concerned with animal welfare. The general NSF application guide "Grants for Research and Education in Science and Engineering" (ask for publication number NSF 92-89) should be followed for all programs. Additional program guidelines are available from Forms and Publications, NSF, 4201 Wilson Blvd., Arlington, VA 22230.

The following partial list of programs (with program officers' names, e-mail addresses, and phone numbers) has June 15 and December 15 target dates for regular proposals and February 1 and September 1 deadlines for dissertation proposals (NSF 89-32).

- Animal Behavior (Fred Stollnitz, fstollni@nsf.gov (703)306-1419.)
- Ecological and Evolutionary Physiology (Sharon Emerson, semerson@nsf.gov (703)306-1421.)
- Population Biology (Mark Courtney, mcourtne@nsf.gov (703)306-1481.)
- Integrative Animal Biology (Elvira Doman, edoman@nsf.gov (703)306-1421.) May not consider dissertation proposals.

The following programs have July 15 and January 15 deadlines and usually do not consider dissertation proposals.

- Behavioral Neuroscience (Chris Comer, ccomer@nsf.gov (703)306-1416)
- Neuroendocrinology (Kathie Olson, kolson@nsf.gov (703)306-1423)
- Sensory Systems (Christopher Platt, cplatt@nsf.gov (703)306-1424)

Other programs include:

- Instrument Development; Multi-user Equipment and Instrumentation Resources (NSF 92-126) June 15 deadline; (Michael Lamvik, mlamvik@nsf.gov (703)306-1472)
- Computational Biology (NSF 92-62) include support for software development, algorithm development, development of new tools and approaches, and workshops and conferences. No deadline; (Peter Arzberger, parzberg@nsf.gov (703)306-1466.)

"Meeting the Information Requirements of the Animal Welfare Act."

A Workshop

The Animal Welfare Information Center (AWIC) of the National Agricultural Library (NAL) has developed a 2 day workshop for individuals who are responsible for providing information to meet the requirements of the Animal Welfare Act.

The objectives of the workshop are to provide:

1. an overview of the Animal Welfare Act and the information requirements of the act.
2. a review of the alternatives concept.
3. a comprehensive introduction to NAL, AWIC and other organizations.
4. instruction on the use of existing information databases/networks.
5. on-line database searching experience.

Workshops will be held on, June 23-24, September 22-23, and December 8-9, 1994. Each workshop will be limited to 12 persons.

For more information, contact AWIC at Telephone (301) 504-6212, Fax (301) 504-6409, Internet address AWIC@NALUSDA.GOV or write to: Animal Welfare Information Center, National Agricultural Library,10301 Baltimore Boulevard, Beltsville, MD 20705-2351

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